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HAYNES AND BOONE, LLP
IP Section
2323 Victory Avenue
Suite 700
Dallas, TX 75219

EXAMINER	
SIVANESAN, SIVALINGAM	

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TSUN-JEN CHAN, YH-HSIU HSIAO,
LU CHENG-TA, and JIAN-HONG WU

Appeal 2016-007411
Application 13/177,395
Technology Center 2100

Before JUSTIN BUSCH, MATTHEW J. McNEILL, and
STEVEN M. AMUNDSON, *Administrative Patent Judges*.

AMUNDSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants[1] seek our review under 35 U.S.C. § 134(a) from a final rejection of claims 1–20, i.e., all pending claims. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] Appellants identify the real party in interest as Taiwan Semiconductor Manufacturing Company, Ltd. App. Br. 3.

STATEMENT OF THE CASE

The Invention

According to the Specification, the invention relates to manufacturing or processing semiconductor wafers. Spec. ¶¶ 10–12.[2] The Specification explains that a "method for processing a plurality of semiconductor wafers" includes: (1) "acquiring a process parameter measurement for each of the semiconductor wafers"; (2) "associating each of the semiconductor wafers with one of a plurality of groups based on a respective process parameter measurement for each of the semiconductor wafers"; and (3) "processing ones of the semiconductor wafers associated with [a respective] group together according to a respective recipe" associated with the respective group. Abstract.

Exemplary Claim

Independent claim 1 exemplifies the subject matter of the claims under consideration and reads as follows, with italics indicating the limitations at issue in claim 1:

> 1. A method for processing a plurality of semiconductor wafers, the method comprising:
>
> performing a first fabrication process on each of the semiconductor wafers within a lot;
>
> *after the first process, acquiring a process parameter measurement for each of the semiconductor wafers within the lot*;

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[2] This decision uses the following abbreviations: "Spec." for the Specification, filed July 6, 2011; "Final Act." for the Final Office Action, mailed April 28, 2015; "Adv. Act." for the Advisory Action, mailed July 7, 2015; "App. Br." for the Appeal Brief, filed December 3, 2015; "Ans." for the Examiner's Answer, mailed June 7, 2016; and "Reply Br." for the Reply Brief, filed July 28, 2016.

> *associating each of the semiconductor wafers within the lot with one of a plurality of groups based on a respective process parameter measurement for each of the semiconductor wafers*, each group including one or more semiconductor wafers, where each respective group corresponds to a respective recipe; and
>
> performing a second fabrication process that is different from the first fabrication process, the second fabrication process comprising, for each one of the groups, processing ones of the semiconductor wafers associated with that group together according to a recipe corresponding to that group.

App. Br. 12 (Claims App.).

The Prior Art Supporting the Rejections on Appeal

As evidence of unpatentability, the Examiner relies on the following prior art:

You et al. ("You")	US 2005/0221596 A1	Oct. 6, 2005
Kuo et al. ("Kuo")	US 7,046,332 B2	May 16, 2006
Lin et al. ("Lin")	US 2008/0275676 A1	Nov. 6, 2008

The Rejections on Appeal

Claims 1–5, 7–13, and 15–20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Kuo and You. Final Act. 3–8; Ans. 2–7.

Claims 6 and 14 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Kuo, You, and Lin. Final Act. 8–9; Ans. 7–8.

ANALYSIS

We have reviewed the rejections of claims 1–20 in light of Appellants' arguments that the Examiner erred. For the reasons explained below, we disagree with Appellants' assertions regarding error by the Examiner. We adopt the Examiner's findings in the Final Office Action

(Final Act. 2–10), Advisory Action (Adv. Act. 2), and Answer (Ans. 3–10). We add the following to address and emphasize specific findings and arguments.

The Rejection of Claims 1–5, 7–13, and 15–20 Under 35 U.S.C. § 103(a)

INDEPENDENT CLAIM 1

Appellants argue that the Examiner erred in rejecting independent claim 1 because:

> [t]he combination of Kuo and You fails to render claim 1 obvious because the combination does not teach "after the first process, acquiring *a process parameter measurement* for each of the semiconductor wafers within the lot" and "associating each of the semiconductor wafers within the lot with one of a plurality of groups based on a ***respective process parameter measurement*** for each of the semiconductor wafers" as recited in claim 1.

App. Br. 7; Reply Br. 2. More specifically, Appellants assert that the Examiner has not identified any teaching that (1) "corresponds with a *process parameter measurement* as claimed" or (2) "wafers are *grouped* based on the *process parameter measurement* that is acquired after a first process." App. Br. 7; Reply Br. 2.

With regard to Kuo, Appellants contend that Kuo's group classification determined according to "a device or mask used in the process is not the same as a process parameter measurement." App. Br. 8, 9; Reply Br. 3. Appellants also contend that Kuo's group classification information does not involve "any *measurement* associated with a wafer." Reply Br. 3; *see* App. Br. 9. In addition, Appellants note that a fabrication device according to Kuo includes an overlay unit and an exposure unit. App. Br. 8; *see* Reply Br. 3. Appellants then contend that "[a] classification based on

the device (overlay unit or exposure unit) that is used would *not* be the same as a classification based on a *measurement* obtained by the overlay unit or exposure unit." App. Br. 8.

With regard to You, Appellants concede that You teaches grouping wafers based on a common recipe. App. Br. 9; *see* Reply Br. 3. Appellants contend, however, that "grouping based on a common recipe is not the same as grouping based on a process parameter *measurement* that is acquired after a first process." App. Br. 9; Reply Br. 3.

Appellants' contentions do not persuade us of Examiner error because they address the references individually and the "Examiner asserts that [the] combination of Kuo and You teaches" the disputed limitations in claim 1. Adv. Act. 2. Where a rejection rests on a combination of references, an appellant cannot establish nonobviousness by attacking the references individually. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). "[T]he test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art." *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971); *see In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Here, the Examiner finds that You discloses acquiring wafer lot records and grouping by common recipe. Adv. Act. 2 (citing You Abstract, claim 1); *see* Ans. 9 (citing You Abstract, claim 1). In particular, You teaches that a "job initiation module" enables a "fabrication tool to process wafer lots utilizing a common recipe" and the "job initiation module acquires wafer lot information regarding which specific wafers require processing by which recipe . . . ." You ¶¶ 10, 24, Fig. 6; *see* Final Act. 4

(citing You ¶¶ 10, 24, Abstract, Fig. 6); Ans. 3 (citing You ¶¶ 10, 24, Abstract, Fig. 6).

In addition, the Examiner finds that Kuo "discloses 'a lot classification database 220 record[s] the group classification information of each wafer in the production line'." Ans. 9 (citing Kuo 3:6–8); *see* Final Act. 2–3 (citing Kuo 3:6–24). In particular, Kuo discloses that first device 210 performs a back-end process, and second device 200 subsequently performs a front-end process. Kuo 3:1–5, 4:30–36, Fig. 1; *see* Final Act. 3–4; Ans. 2–3. Before performing the back-end process, first device 210 obtains a group compensation value based on the group classification in classification database 220. Kuo 3:13–21, 3:33–39, Fig. 3. First device 210 then uses that group compensation value to adjust various parameters during the back-end process. *Id.* at 2:53–60, 3:21–24, 3:40–43, 4:30–32, Fig. 3. After completing the back-end process, first device 210 updates the group classification in classification database 220 according to the "device and mask" used by first device 210 in the back-end process. *Id.* at 3:43–47, 4:39–47, Figs. 2–3; *see* Ans. 10. Before performing the front-end process, second device 200 obtains a group compensation value based on the group classification in classification database 220. Kuo 2:53–67, 3:13–21, 4:33–38. Second device 200 then uses that group compensation value to adjust various parameters during the front-end process. *Id.* at 2:53–67, 3:21–24, 4:33–38. After completing the front-end process, second device 200 updates the group classification in classification database 220 according to the "device and mask" used by second device 200 in the front-end process. *Id.* at 3:8–12, 3:28–32, Fig. 2.

Based on Appellants' Specification, the Examiner determines that (1) "'a process parameter measurement' is merely any measurement associated with a wafer" and (2) Kuo's group classification information "is equivalent to 'a process parameter measurement.'" Ans. 9 (citing Spec. ¶ 41). The Examiner then determines that the combination of disclosures in Kuo and You teaches or suggests the disputed limitations in claim 1. *Id.* at 9–10; *see* Adv. Act. 2; *see also* Final Act. 2–3, 4–5; Ans. 3.

In response to the Examiner's determination that Kuo's group classification information "is equivalent to 'a process parameter measurement,'" Appellants assert that "Kuo's group classification information still does not teach any *measurement* associated with a wafer." Reply Br. 3. Appellants' assertion disregards the Specification's discussion of "a process parameter measurement." The Specification explains that (1) "a process parameter measurement" may be made "directly or by inference" and (2) "measurement results include measurements taken directly from each wafer or inferred from each wafer or a subset of the wafers." Spec. ¶¶ 41, 50; *see id.* ¶¶ 15, 28. As an example, the Specification notes that "[a] process parameter may in some instances be inferred by the physical placement of a wafer or other known process phenomenon." *Id.* ¶ 28.

As explained above, Kuo discloses that first device 210 updates the group classification in classification database 220 according to the "device and mask" used by first device 210 in the back-end process, and second device 200 subsequently obtains a group compensation value based on the group classification in classification database 220 to use during the front-end process. Kuo 2:53–67, 3:13–21, 3:43–47, 4:33–47, Figs. 2–3. Hence, Kuo

teaches or suggests "a process parameter measurement" made by inference from the "device and mask" used by a device.

Further, the Examiner finds for claim 5 that Kuo discloses acquiring a process parameter by measuring the process parameter. Final Act. 5 (citing Kuo 1:44–49, 3:6–12); Ans. 4 (citing Kuo 1:44–49, 3:6–12). For instance, Kuo instructs that device performance may vary over time, and "[f]or a precisely accurate exposure, the wafers processed must be measured to compensate for parameters (recipe) used by" a device. Kuo 1:44–47. Appellants do not address the Examiner's findings concerning claim 5. App. Br. 7–10; Reply Br. 2–4.

Because Appellants' arguments have not persuaded us that the Examiner erred in rejecting claim 1 for obviousness based on Kuo and You, we sustain the rejection of claim 1.

INDEPENDENT CLAIMS 9 AND 17 AND
DEPENDENT CLAIMS 2–5, 7, 8, 10–13, 15, 16, AND 18–20

Appellants assert that "the arguments made above in favor of the patentability of claim 1 apply to" independent claims 9 and 17 as well as dependent claims 2–5, 7, 8, 10–13, 15, 16, and 18–20. App. Br. 9–10; Reply Br. 4. Appellants do not make any separate patentability arguments for independent claims 9 and 17 or dependent claims 2–5, 7, 8, 10–13, 15, 16, and 18–20. Because Appellants do not argue the claims separately, we sustain the rejection of claims 2–5, 7–13, and 15–20 for the same reasons as claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

The Rejection of Claims 6 and 14 Under 35 U.S.C. § 103(a)

Appellants do not make any separate patentability arguments for dependent claims 6 and 14. App. Br. 10; Reply Br. 4. Although Appellants

assert that "Lin fails to remedy the deficiencies of Kuo and You," Appellants do not attempt to distinguish claims 6 and 14 from Kuo, You, or Lin. App. Br. 10; Reply Br. 4. Because Appellants do not argue the claims separately, we sustain the rejection of claims 6 and 14 for the same reasons as claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

DECISION

We affirm the Examiner's decision to reject claims 1–20.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED